

Systematic and biological notes on some brachycerous Diptera of Southern Rhodesia

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The following paper consists of short systematic and biological notes on some Stratiomyidæ and Asilidæ of Southern Rhodesia. The immature stages of *Ptecticus posticus* Wied., *Neolophonotus porcellus* Speis., and *Promachus negligens* Ad. are described, and notes are given on the distribution and habits of some little-known Dasypogonine "robber flies". *Lasiocnemus fascipennis* n.sp. from S. Rhodesia and N.W. Tanganyika, and *Stichopogon maculipennis* n.sp. from Urungwe, Lomagundi district, are described.

Family STRATIOMYIDÆ.

Sub-fam. Geosarginæ.

1. *Ptecticus posticus* Wiedemann.

Wiedemann 1830, p. 34; Loew 1860, p. 6.

In Africa very little information is available regarding the breeding places of Stratiomyidæ. In S. Rhodesia *Microchrysa deannulata* Lindr. has been reared at Salisbury from larvæ in cow-dung and litter, associated with the larvæ of *Stomoxys*. *Aspidacantha atra* Kert., *Sternobrithes loewi* Lindr. and *S. tumidus* Lw. breed in decaying tubers of potatoes and sweet potatoes (*Ipomoea*) at Salisbury. *Ptecticus posticus* Wied. inhabits the kloof-forests of the Vumba Mountains (5,000—5,500 ft.) near Umtali, and breeds in the decaying fruits of a tree, *Conopharyngia johnstoni* Stapf. (*Apocynaceæ*). Species of *Odontomyia* which breed in water have not been investigated.

The larvæ of *Ptecticus* are slow-moving, living in the semi-liquid mass of decaying flesh of the *Conopharyngia* fruits. They were associated with the larvæ of crane-flies (*Tipulidæ*), *Rhyphus annulicornis* Edw. (*Rhyphidæ*) and other dipterous larvæ. When fully fed the larvæ entered the soil, and pupated within the last larval skin (puparia). The duration of the pupal stage in March, 1938, under outdoor insectary conditions at Salisbury, varied from two to three weeks. It was observed that the imago emerged through a T-shaped slit in the thoracic segments of the puparium, the head and prothoracic segment usually falling away during the process. The pupal

skin did not protrude from the puparium after eclosion, as was recorded for a related species, *Solva caffra* Big., (Xylophagidæ), by the authors, Engel and Cuthbertson (1937, pp. 3—4).

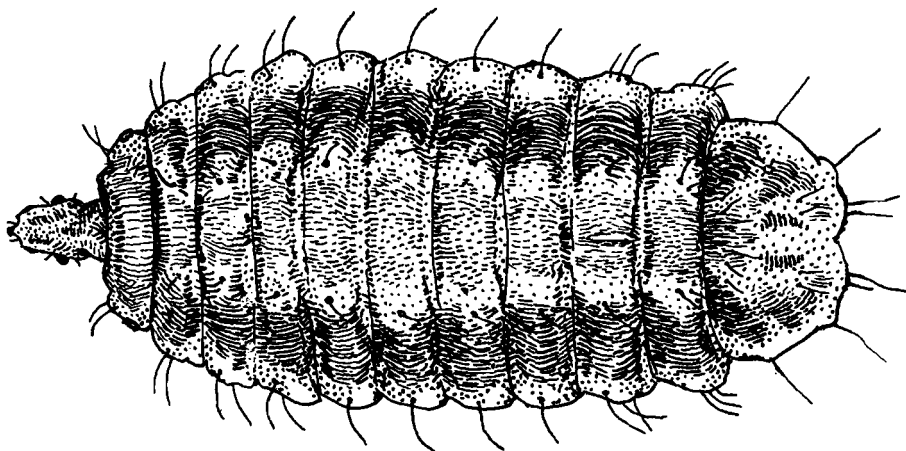


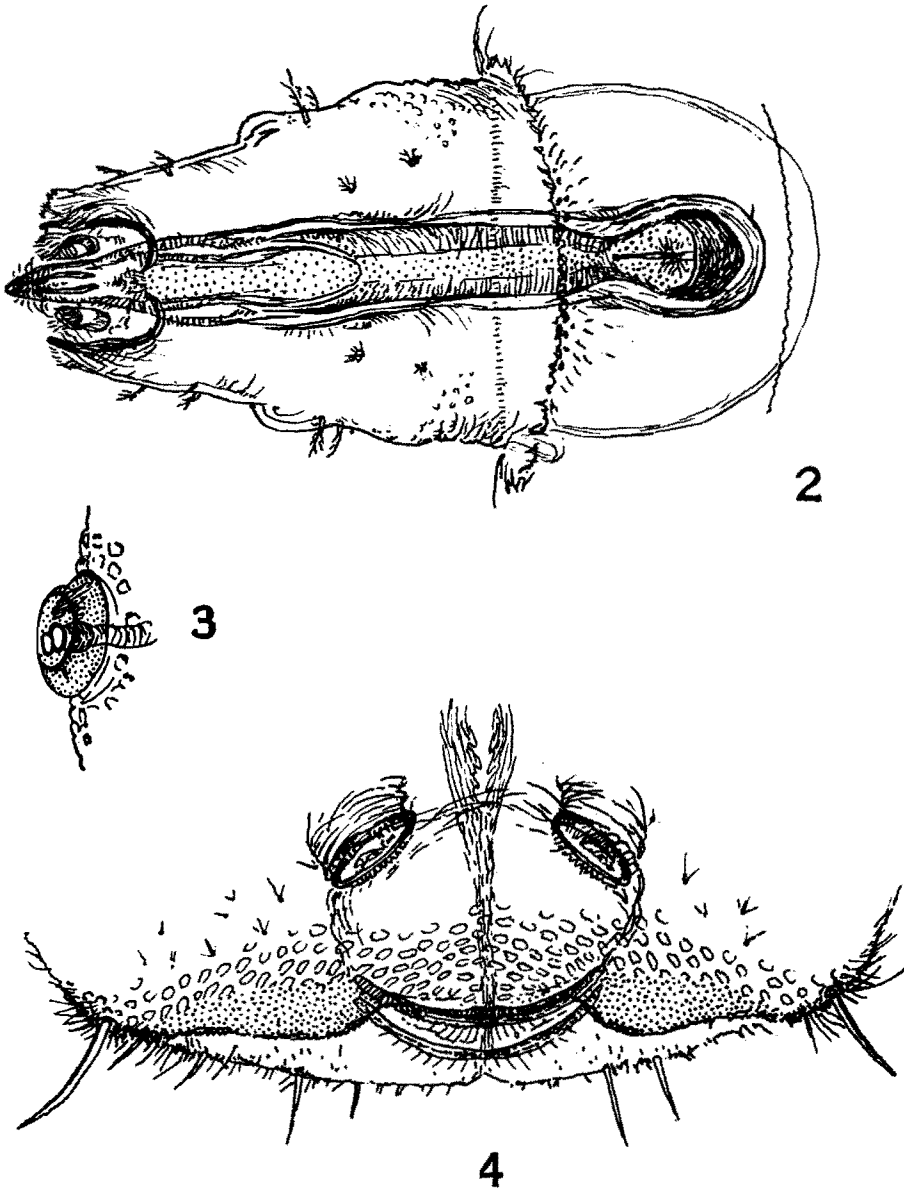
Fig. 1. *Ptecticus posticus*, larva: dorsal view.

Description of Larva.

Length of mature larva 10—12 mm., breadth 4 mm.; body flattened dorsoventrally, consisting of twelve apparent segments including the head; general coloration on dorsum yellowish brown with three dark broad longitudinal stripes or bands, the middle band being indistinct; underside of body of a light yellowish brown colour without markings; integument of head and body granulated amphipneustic, non-functional lateral spiracles not observed.

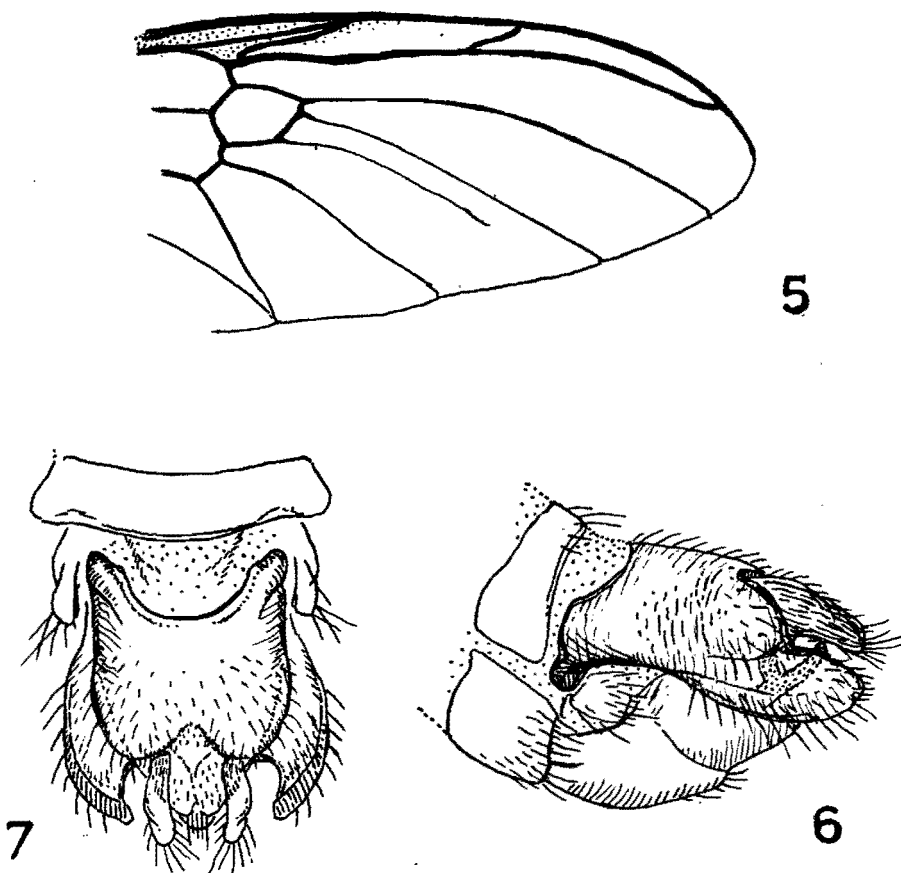
Head and mouth parts (Fig. 2), head long and narrow, not retractile; on the anterior part laterally with three pairs of plumose hairs, and behind the so-called "eye spots" one longer pair of plumose hairs; ventral side of head with two pairs of plumose hairs. Mouth parts with a beak-like labrum, and two long curved ventral sclerites; pharynx with an endoskeleton attached, and ending in a chitinized "bulb" situated in the first thoracic segment. Mouth opening divided by a partition, as shown by Becker (1910).

Thorax: thorax with a pair of simple bristles, long and outwardly directed on lateral margins of each segment; second and third segments with a bristle on each side of the middle band; first thoracic segment on the underside with nine bristles, second and third segments with six ventral bristles. Anterior spiracles (Fig. 3) situated laterally on prothoracic segment, with two round openings, and a thick peritreme.



Figs. 2—4. *Plecticus posticus*, larva, 2: cephalic segment, ventral view; 3: anterior spiracle, lateral view; 4: apex of terminal segment, showing posterior spiracles.

Abdomen: a bristle present on each side of the middle dorsal stripe, and strong lateral bristles on segments one to five; segments six and seven with three or four lateral bristles, terminal or anal segment with four pairs of marginal bristles, no bristles on under-side of anal segment; posterior spiracles (Fig. 4) are situated on the anal segment which resembles the mouth of a fish, and which opens by a ciliated transverse slit; each spiracular plate is provided with numerous marginal "openings".



Figs. 5—7. *Ptecticus posticus*, 5: wing; 6: male terminalia, lateral view; 7: male terminalia, dorsal view.

The specimens of *Ptecticus* reared from the larvæ described above, agree with specimens determined as *Ptecticus posticus* Wied.

in the Zoologische Staatssammlung, Munich. They differ, however, from the original description in their wholly dark-coloured hind tarsi; another species, *Ptecticus elongatus* F., which has the second, third and fourth joints of the posterior tarsi white, also occurs in the forests of the Vumba Mountains, and it has been observed at decaying fruits of *Conopharyngia*. We have, therefore, illustrated the venation of the wing, (Fig. 5) showing the vein R_{2+3} meeting R_1 near the margin, and the male genitalia (Figs. 6 & 7), in order to establish the identity of the species which we have studied.

Family ASILIDÆ, (Robber Flies).

Sub-fam. Leptogasterinæ.

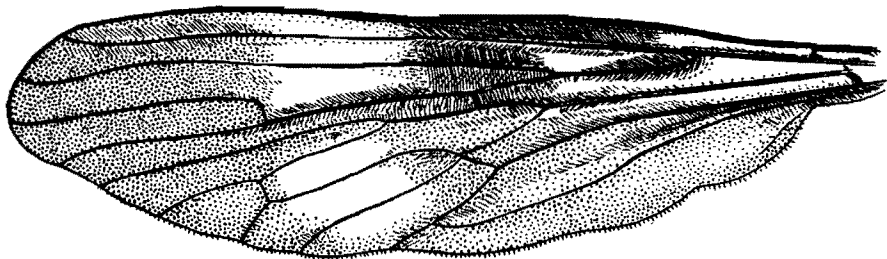
2. *Lasiocnemus fascipennis* sp.nov.

L. fascipennis was mentioned but not described by Prof. Hermann 1924, p. 149, and consequently we take this opportunity of briefly describing it.

A large species; length of body 20—26 mm., of wings 12.5—13 mm.

Head: face brassy yellow with shimmering patches in certain lights; mystax composed of black bristles, proboscis and palpi black, colour of antennæ mahogany brown to black; third segment one and a half times as long as the two basal segments together; terminal bristle short, greyish pubescent; vertex and occiput blackish with ashy grey dust and black hairs which are greyish on lower part.

Thorax: anterior part of thorax and the pleura more or less mahogany brown to dark reddish, somewhat shiny with a dark middle stripe; posterior part of thorax and upper part of pleura blackish with short whitish pubescence; metapleural hairs black; postalar bristles short.



8

Fig. 8. *Lasiocnemus fascipennis*, wing.

Wings: (Fig. 8) with two broad brown transverse bands, the proximal one being almost black at the fore margin and becoming lighter towards the hind margin; the apical band extends from the tip of the wing to a line which cuts the apex of the discal cell, and the base of the fork of the third longitudinal vein; venation as in Fig. 8: five posterior cells, anal cell closed and with a long petiole, as in some other species of *Leptogasterinæ*.

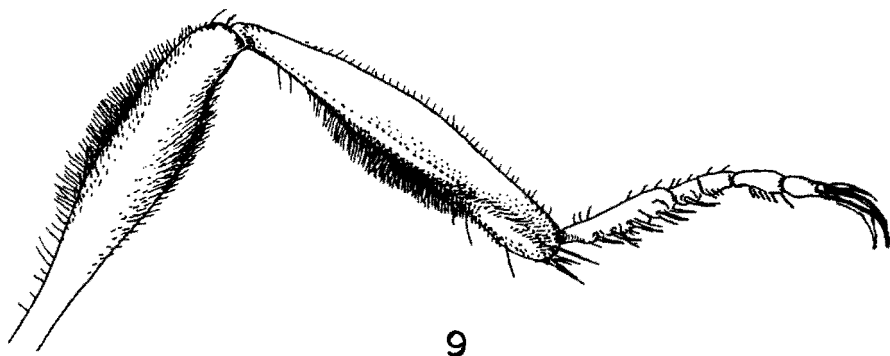


Fig. 9. *Lasiocnemus fascipennis*, hind leg.

Legs: reddish to mahogany brown, posterior femora and posterior tibiae spindle shaped, appearing dark owing to the covering of short black hairs; apical part of posterior tibiae and posterior metatarsus on underside with shining greyish white pubescence; the four apical spurs of posterior tibiae, the two spurs of anterior and middle tibiae, and the bristles on the underside of the tarsi are black. Empodium, or median bristle, is three quarters as long as the black claws.

Abdomen: dark mahogany brown; apical three abdominal segments of male and apical four segments of female, swollen, dark-coloured; anterior border of second tergite, and posterior border of other tergites with grey dust; first tergite short, with black bristly hairs; the sides of second tergite with some soft greyish hairs; sternites black on basal part, else-where brownish with some white pubescence. *Hypopygium:* blackish brown with yellow hairs, upper forceps furcate.

Holotype male, in copula with female, N.W. Tanganyika, (coll. Grauer). *Allotype*, female; both in Zoologische Staatssammlung, Munich. *Paratype* female, Lomagundi, March, 1938. (coll. R. H. R. Stevenson) in National Museum, Bulawayo.

Sub-fam. *Dasypogoninae*.3. *Hypenetes stigmatias* Loew.

Loew 1857, p. 350; 1860, p. 89; Engel 1929, p. 166—7 Fig. 14.

In Southern Rhodesia this species is known only from the Urungwe sub-district, Lomagundi. The flies occur on rocks in dry riverbeds, and on the ground. A female was taken with a small Hymenopteron on 22nd August, 1938, by J. G. Clarkson.

4. *Gonioscelis mantis* (Loew) Engel.

Engel 1925, p. 168—9.

A large species which is common on the western commonage of Salisbury during April and May. The flies occur on the ground or rest on tall grass stems beside sandy paths in shade. They prey upon small beetles.

5. *Gonioscelis submaculatus* Speiser.

Speiser 1910, p. 90.

In S. Rhodesia this species occurs in the Nyamandhlovu district in Matabeleland, and in Northern Lomagundi, Mashonaland. It is prevalent in the Urungwe sub-district, Lomagundi, and at Kariba Gorge on the Zambezi River during August and September. The flies occur on the ground and prey on small insects, such as Stratiomyid flies and Hymenoptera.

6. *Scylaticus punctatus* Engel.

Engel 1932. pp. 281—2.

A scarce species in Rhodesia, being known from the Bulawayo district and Nanganya River, Urungwe, Lomagundi district, one male being taken in October, 1938, by W. L. Williams. The basal segments of antennæ and the hypopygium are mostly reddish brown.

7. *Stichopogon inaequalis* Loew.

Séguy 1927, p. 62.

Widely distributed in Mashonaland, having been recorded from the Lomagundi, Salisbury, Marandellas and Hartley district. The species is prevalent from August to December. The flies occur on sandy soil usually near pools, rivers or ditches, and when disturbed fly only a few feet from the observer. The colour of the eyes of both sexes in life is dark brown, and not green, as is usual for Asilidæ and some other predaceous insects. The prey consists of small soft-bodied insects such as acalypterate Diptera. A female was observed

repeatedly attempting to capture a small fly, *Lispa leucospila* Wied. at Wedza on 27th December, 1938.

8. *Stichopogon maculipennis* sp.nov.

A small species (6.5—7.5 mm.) allied to *S. punctum* Lw. and *S. hermanni* Bez., with reddish legs, and a diffuse brown patch near the apex of the wing. *Head*: mystax in male whitish, in female yellowish white, confined to the upper margin of the mouth opening, some scattered white hairs on the silvery white face. Frons golden ochreous covered with fine white hairs; vertex and ocellar tubercle with yellowish bristles.

Thorax: pleura and metanotum with silvery white tomentum; mesonotum with a complicated design of ochreous and silvery white spots and brownish stripes. Chaetotaxy as follows: one intraalar, one supraalar and one or two postalar bristles, the latter mixed with some yellowish hairs. Posterior margin of mesopleura with some longer white hairs; metapleura with white hairs in the "fan" of bristles. Scutellum ochreous with yellow hairs on disc, and a double row of marginal bristles.

Legs: reddish, covered with fine white tomentum, metatarsus reddish, the other joints of the tarsi darker, brownish; bristles and short hairs on legs wholly white; claws black, pulvilli brownish. *Wings*: venation as in *O. punctum* Lw.; posterior cells open, anal cell closed and with a short petiole or stalk; colour faintly clouded, veins brown, yellowish at the base and on the fore border of wing; a diffuse brownish patch near apex of wing stretching from R_1 to R_4 (upper branch of fork). Halteres yellowish.

Abdomen: silvery grey with the hind margins yellow; tergites each with a brown triangular marking, the first tergite with a small round spot, second and third tergites with a large marking; the triangular marking on each tergite has its base on the yellowish posterior margin. In the female the markings are of equal size on the second to fifth tergites, the sixth and seventh being wholly brown. In the female, the last two tergites are whitish. The spines of the ovipositor are black, the lateral lamellæ are brownish, triangular, simple in structure, with a white ciliated margin. The ground colour of the last three tergites of male is somewhat ochraceous. The hypopygium of male is silvery white.

Holotype male, and *Allotype*, female, Kariba Gorge, Zambezi River, Urungwe, Lomagundi district, 9th July, 26th Aug. 1938, (*J. G. Clarkson*), to be deposited in the National Museum of S. Rhodesia, Bulawayo. *Paratypes* are in the Zoologische Staatssammlung, Munich, and in the collections of the Entomological Branch, Salisbury.

Note on habits and prey: The flies occur on sand near the water's edge, Zambezi River at Kariba Gorge. The prey observed by W. L.

Williams and J. G. Clarkson were small grasshoppers, and a homopterous bug, *Dictyophora* sp. The species is prevalent during the period July to September. It was at one time considered by us to be a variety of *O. punctum*, and the junior author has published a note under this name, Cuthbertson (1938, P. 118).

9. *Oligopogon penicillatus* Loew.

Loew 1857, p. 350; 1860, p. 93.

A rather scarce species which is known in Southern Rhodesia only from the highlands of the Umtali district. The flies occur at the edges of the forests on twigs of shrubs about five feet from the ground, and dart at small midges (Chironomidae).

The three species of the genus *Oligopogon* Lw. may be separated by the following key: —

1. Hairs of mystax black to brownish black; all bristles and hairs of thorax black; scutellum shining black; abdomen grey dusted 2
- Hairs of mystax whitish; hairs and bristles of thorax forming the acrostichal and dorsocentral rows whitish; scutellum with a grey tomentum; abdomen with grey tomentum, but the hind margins of the segments, and a spot on each tergite shining black; wings hyaline . . . *pollinosus* Engel, (1932, p. 282).
2. Wings wholly dark brown; pleura of thorax with ashy grey tomentum, and shining black stripes on medium and lateral area . . . *nigripennis* Engel, (Engel & Cuthbertson 1937, p. 14).
- Wings hyaline; pleura and metanotum wholly covered with ashy grey tomentum; abdomen with tergites shining black except at sides where they are grey dusted; sternites grey dusted *penicillatus* Loew.

10. *Neolaparus cuneatus* Loew.

Loew 1857, p. 343; Loew 1860, p. 59; Bromley 1936, p. 139.

In S. Rhodesia this species occurs in the highlands of the Eastern districts and Lomagundi. It is prevalent from December to March. In the Vumba Mountains (5,500 ft.) near Umtali, a female was taken during February, 1938, with a winged ant, male, *Rhoptromyrmex globulinodis* Mayr.

Group *Prytaninae*.

11. *Trichardis grisescens* Engel.

Engel 1924, p. 108.

In S. Rhodesia this species is known from the Nyamandhlovu district, Matabeleland, and Urungwe, Lomagundi district. At Kariba Gorge, Zambezi River, it is found on leaf-strewn ground in September. The prey consists of leaf-hoppers and small Hymenoptera, (teste W. L. Williams). Rhodesian specimens (males) are much larger than the types which came from Gambia.

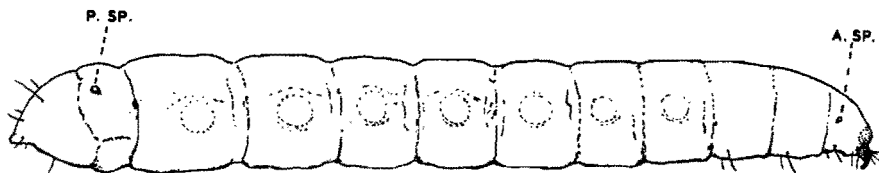
Sub.-fam. Asilinæ.

12. *Neolophonotus porcellus* Speiser.

Speiser 1910, p. 102; Engel 1927, p. 158.

This species is prevalent in the Salisbury district from March to May. The flies have been observed on over-hanging twigs of shrubs, on fence wires, and on the stems of tall grasses (*Hyparrhenia* and *Setaria*). Their prey consists of small insects such as leaf-hoppers (*Fulgoridæ*, *Jassidæ*), *Melolonthid* beetles, and moths (*Noctuidæ*, *Pyralidæ*). They make a buzzing noise in flight.

At Stamford Farm near Salisbury in early April, 1938, some larvæ were found in rich humus soil at the roots of large maize plants where they were associated with „white grubs”, the larvæ of *Eulepida mashona* Arrow (*Melolonthidæ*). The larvæ were removed together with soil from their habitat as well as live *Eulepida* grubs, to earthenware pots which were kept in an outdoor insectary. Several larvæ pupated at the surface of the soil on 18th April and a female emerged on 3rd May, 1938. The remaining larvæ and pupæ were preserved and are now in the collections of the Entomological Branch, Agricultural Laboratories, Salisbury. The nature of the food of the larvæ has not been ascertained but it was observed that, in the rearing pots, none of the “white grubs” were attacked. A single larva of *Muscina stabulans* Flin. (*Muscidæ*) was found inside the body of a *Neolophonotus* larva, but the latter was probably dead or dying when attacked. A larva of *Neolophonotus* was placed in a large rearing jar with soil containing a “wireworm”, (the larva of *Trachynotus*), to see if the latter would be attacked. However, it was the *Neolophonotus* larva which was devoured by the wireworm in the absence of plant food! The study of the food of larval Asilids is one which we hope will attract the attention of entomologists in Africa, because apart from the investigation by Melin, 1923, pp. 257—270 in Sweden, no detailed investigations have been made.

The immature stages

10

Fig. 10. *Neolophonotus porcellus*, larva: lateral view; A. SP. — anterior spiracle; P. SP. — posterior spiracle.

Larva (Figs. 10—12). Length of mature larva 20—22 mm., breadth 2.0—2.6 mm. on terminal segment, general coloration shining ivory white; body cylindrical, long and slender, composed of head and eleven apparent segments; amphipneustic.

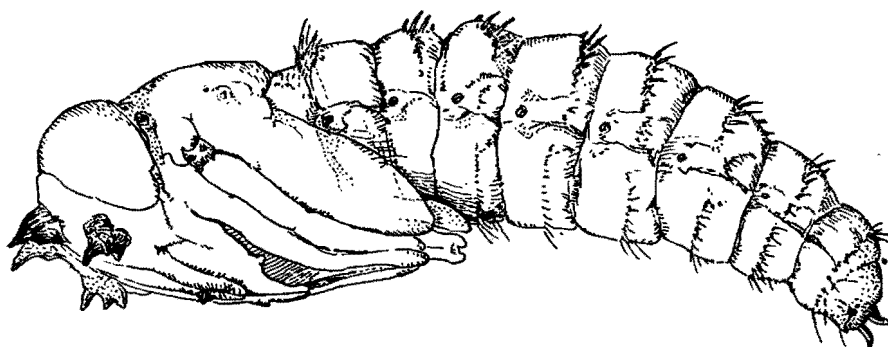


Figs. 11 & 12. *Neolophonotus porcellus*, larva, 11: anterior spiracle; 12: posterior spiracle.

Head: head capsule retractile, of the usual Asiline appearance, sembling that of *Dysmachus forcipula* Zell. figured by Mellin (1923, p. 119).

Thorax: each segment with a long lateral bristle, directed outwards; anterior spiracles (Fig. 11) situated on lateral margin of the prothoracic segment.

Abdomen: dorsal and ventral contractile processes indistinct; lateral swellings or callosities on segments one to seven rather large and conspicuous; terminal segments with an unchitinized, ill-defined, "keel" at apex; anal or posterior spiracles (Fig. 12) on the dorsum of the basal division of the segments, and of the usual multiporous type. On apical division of the anal segment there are a pair of dorsal bristles, a pair of ventral bristles, and two pairs of bristles at the "keel" area, resembling that shown by Melin 1923, p. 163 (Fig. 181) for a European species.



13

Fig. 13. *Neolophonotus porcellus*, pupa: lateral view.

Pupa (Fig. 13). Length of pupal exuvium or skin 14 mm.; breadth at first segment of abdomen 3.5 mm.; general colouration golden yellow.

Head and thorax: one pair of simple anterior "antennal" processes on head, a pair of posterior processes with three "teeth"; sheath of labrum with a dark knob-like process on the middle line; sheaths of posterior legs at coxæ with two dark spines; base of wing sheath with a short dark spine; leg sheaths reaching to end of second segment; thoracic spiracle at hind margin of eye not prominent; dorsum of thorax at the middle with transverse wrinkled area which may be peculiar to species of the *Neolophonotus* group.

Abdomen: eight dorsal transverse rows of pale yellowish spines, large, those on ventral segments smaller; lateral area or "side piece" with six to eight small spines; lateral spiracles oval, not much raised, present on all segments except the anal or terminal segment. The presence of anal spiracles appears to be characteristic of Laphriine pupae so far known from Africa. The pupa of *Hyperechia marshalli* Aust. (Laphriinæ) described by the authors, (Engel and Cuthbertson, 1934, p. 42) has functional anal spiracles, while those of *Proagonistes austeni* Brom. (Laphriinæ) described by the senior author (Engel, 1932, p. 255) are apparently not functional. Malloch 1917, (Pl. 53 & 54) does not illustrate or mention anal spiracles in the American Asiline pupae which he studied.

Systematic Notes.

Rhodesian specimens of *N. porcellus* agree with those from Meru, N.W. Tanganyika, in the Zoologische Staatssammlung, Munich. The key to species of *Neolophonotus* given by the senior author, Engel, 1927, p. 150, should be amended from section 9 as follows:—

9. Bristles on sides of mesonotum white or yellow, or at least some of them 10
Bristles on sides of mesonotum black; bristles on tarsi black . . . 11

10. Tibiæ of fore and middle legs bright yellow with a black apical band; all tarsi with whitish bristles dorsally; tibiæ and femora with mixed black and white bristles. Hypopygium Fig. 18 (*loc. cit.*). Large species 25—27 mm.
robustus Ricardo.

Tibiæ of fore and middle legs brownish yellow, with a black apical band and a ventral stripe; all legs and with long dense yellowish hairs. Hypopygium. Fig. 21. Small species 12—14 mm. Abyssinia . . . *holoxanthus* Hermann in litt.

11. Tibia and some tarsi of fore and middle legs dark brownish yellow; femora somewhat metallic coloured. Hypopygium Fig. 20 . . . *suillus* Fabricius. Tibiæ of all legs bright yellow with a black band at apex, and with or without a black ventral stripe . . . 12

12. Tibiæ of all legs with broad reddish yellow bases and black apices, with scanty white hairs. Mystax sometimes wholly black. Hypopygium Fig. 17 and 17a . . . *porcellus* Speiser.

Tibiae ochre yellow with black apices and black ventral stripes Hypopygium
Fig. 19 *orientalis* Ricardo.

13. *Neolophonotus nigripes* Ricardo.

Ricardo 1920, p. 438; Engel 1927, p. 174.

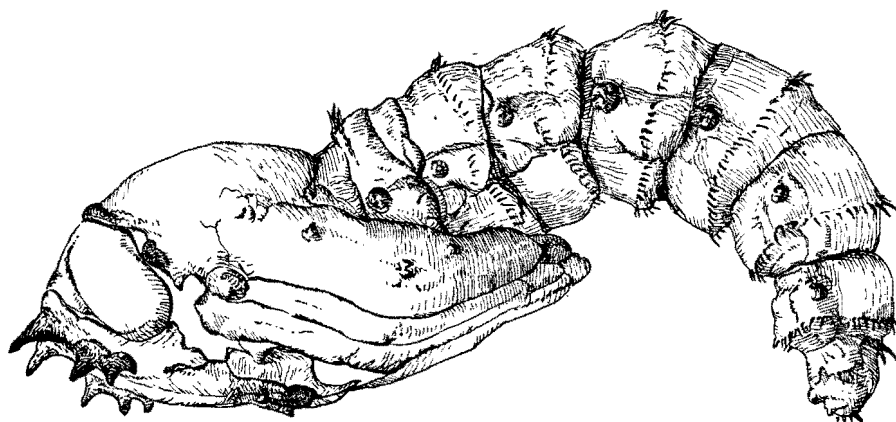
In Southern Rhodesia this species is known from Nyamandhlovu district, Matabeleland, and the highlands of the Umtali district. On the Vumba Mountains (5,000—5,500 ft.), it occurs during February and March among long grass near the edge of kloof forests. The prey consists mostly of small soft-bodied insects such as flies and moths. A female was taken on 27th February, 1938, with a small fly, *Coenosia semifumosa* Stein, male, (Muscidæ) near the Vumba Hotel, and a male with an ant, *Xiphomyrmex weitzæckeri* Em., male, on 5th Mar. 1938 at the same locality.

14. *Promachus negligens* Adams.

Adam 1905, p. 154; Cuthbertson 1937, p. 17.

In the Hartley and Lomagundi districts this species is common during the late dry season in savannah forest. The flight is direct and swift, the flies making long capture darts at insects which are often of large size, such as cicadas, cockchafers, grasshoppers and Pentatomid bugs. The colour of the eyes of both sexes in life is green.

Regarding the immature stages only the pupa is known at present, having been discovered by W. L. Williams near Gota-Gota camp in the Urungwe sub-district of Lomagundi in September, 1938. The pupa occurred on the surface of sandy soil, the anterior part of



14

Fig. 14. *Promachus negligens*, pupa: lateral view.

the body protruding from the ground. A female emerged from this pupa on 30th October, 1938. The following description is based on the pupal exuvium or skin, which is preserved in the collections of the Entomological Branch, Salisbury.

Description of Pupa, (Fig. 14). Length of pupal skin 25 mm., breadth measured at base of wing sheaths 7 mm., and 6—4.5 mm. on terminal segment; general coloration dull ochre yellow.

Head and thorax: anterior "antennal" process of head is large, blunt-pointed, the posterior process with three blunt "teeth"; sheath of mouth parts dark brown; sheath of hind legs at coxæ with two dark-pointed spines, the apices of legs reaching almost to the level of the third abdominal spiracle; wing-sheaths short, at base with a blunt process, and with some spine-like processes arranged as in figure. Thoracic spiracles on hind margin of eye kidney-shaped, brown, rather prominent, as noted by Malloch, 1917, p. 383 for an American species.

Abdomen: dorsal transverse row of larger and smaller dark spines on each of the first to seventh segments; spines at sides and on sternites smaller, rather closely set; lateral spiracles large, brown, kidney-shaped and prominent; anal or terminal segment armed at apex with four dark spine-like processes, the dorsal pair larger, anal segment with a pair of median ventral processes and a large blunt process on the under side; terminal segment with a dark mark on each side of dorsum near the transverse row of spines, but no functional spiracles were observed.

Acknowledgments.

The authors are pleased to have this opportunity of thanking Messrs. W. L. Williams and J. G. Clarkson of the Entomological Branch, Department of Agriculture, Salisbury, Southern Rhodesia and Capt. R. H. R. Stevenson of Bulawayo for presenting to us some very interesting material for study. Dr. George Arnold, Director, National Museum of S. Rhodesia, Bulawayo, kindly identified the ants mentioned in this paper. Dr. A. J. Hesse of the South African Museum, Cape Town, has supplied bibliographical information.

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